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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

		Complete if Known	
	Application No.	10/642,477	
	Filing Date	August 15, 2003	
	First Named Inventor	Masakazu Kawai	
	Art Unit	3736	
	Examiner Name	Jeffrey Gerben Hoekstra	
_	Attorney Docket Number	20911-08172	

			U.S. PATENT DOC	UMENTS
	T	Document No.		
Examiner Initials*	Cite No.	Number – Kind Code ² (if known)	Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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ſ				FOREIGN PATENT	OOCUMENTS	
	Examiner : Initials*	Cite No.1	Foreign Patent Document Country Code ³ – Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	₹6

		OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS	
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Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ⁶
JH	C1	HSIANG, S.M. et al., "Three Different Lifting Strategies for Controlling the Motion Patterns of the External Load,"	
	ļ	Ergonomics, 1997, pp. 928-939, Vol. 40, No. 9.	
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Examiner Signature	/Jeffrey Hoekstra/	Date Considered	07/06/2006
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	1	Foreign Patent Document			
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	R1	RU 2 107 328 C1	03-20-1998	Nurislamovich Latvoov (English Abstract only)	—
	T			(English Abstract only)	
JH	B2	WO 00/35346	06-22-2000	Stanford University	L

		OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.'	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T [©]
	C1	AGARWAL S.K. et al. Theory and Design of an Orthotic Device for Full or Partial Gravity-Balancing of a Human Leg	
		During Motion," IEEE Transactions on Neural Systems and Rehabilitation Engineering, June 2004, Vol. 12, No. 2.	
	C2	AKHI AGHI, F. et al. "In-shoe Biaxial Shear Force Measurement: the Kent Shear System." Medical & Biological Engineering	
	Ī .	& Computing, July 1996, Vol. 34, pp. 315-317.	
JH	СЗ	ANDERSON, Frank C., "Static and Dynamic Optimization Solutions for Gait are Practically Equivalent", Journal of Biomechanics, 2001, Vol. 34, pp. 153-161	
JH	C4	ANDERSON, F. et al., "Dynamic Optimization of Human Walking," Journal of Biomechanical Engineering, October 2001, Vol. 123, pp. 381-390.	
	C5	ANDERSSEN, R. et al., "Numerical Differentiation Procedures for Non-Exact Data," Numererische Mathematik, 1974, Vol.	
		22, pp.157-182.	<u> </u>
	C8	ATKESON, C.G., Learning Amir Kinematics and Dynamics , Annual Reviews, Inc., 1969, Vol. 12, pp. 157-163	
	C7	BAROH, H., Analytical Dynamics, Chapter 7, Kight Gody Kinematics, McCsraw-ruii, 1999, pp. 333-371.	
	C8	BLAYA, J., "Force-Controllable Ankle Foot Orthosis (AFO) to Assist Drop Foot Gait," February 2003,	
_		web.mit.edu/jblaya/www/MSthesis final.pdf	ļ
	C9	BRONZINO, J.D., cd., 'The Biomedical Engineering Handbook', IEEE Press, 2 rd Ed. Vol. 2, 2000, Chapter 142, pp. 1-17	
	C10	BURDEA, O. ET AL., Without Reality Technology*, 1004, pp. 00-07, John Wiley and Bons, Inc.	+-
	C11	BUSBY, H.R. et al., "Numerical Experiments With a New Differentiation Filter," Transactions of the ASME - Journal of	<u> </u>
		Biomechanical Engineering, November 1985, Vol. 107, pp. 293-299.	↓
	C12	CHAO, E.Y. et al., "Application of Optimization Principles in Determining the Applied Moments in Human Leg Joints During	┿
		Galt, J. Biomechanics, 1973, Vol. 6, pp. 497-510, Pergamon Press, Great Britain.	
	C13	CRAIG, J.J., "Nonlinear Control of Manipulators," Introduction to Robotics Mechanics and Control, 2 nd , Ed., 1989, Chapter	+
		10, PP. 333-361.	┼
	C14	ORGWHINGHIELD, R.D. et al., W Physiologically Desert Offician Of Mascle Force Prediction in Ecomotion, Journal of	<u> </u>

	Examiner Signature	/Jeffrey Hoekstra/	Date Considered	07/06/2006
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STATEMENT BY APPLICANT					First Named Inventor	Masakazu Kawai	
					Art Unit	3736	
					Examiner Name	Jeffrey Gerben Hoekstra	
Sheet	3	of	T .	5	Attorney Docket Number	20911-08172	

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tnitiats*	No.	published					
		Biomechanics, Vol. 14, No. 11, 1981, pp. 793-801.					
	C15	CULLUM, J., Numerical Differentiation and Regularization, SIAM J. Numer. Anal., June 1971, Vol. 8, No. 2, pp. 254-265.					
	C16	DARIUSH, B. et al., "Multi-Modal Analysis of Human Motion From External Measurements," Transactions of the ASME,	ŀ				
JH		June 2001, Vol. 123, pp. 272-278.					
	C17	DARIUSH B "A Novel Algorithm For Generating A Forward Dynamics Solution To The Traditional Inverse Dynamics	-				
		Problem,* In 4th World Congress of Blomechanics, Calgary, Canada, 2002.					
	C18	DARIUSH B. "A Forward Dynamics Solutions To Multi-Modal Inverse Dynamics Problems," In International Society of	<u> </u>				
		Biomechanics, XIXth Congress, Dunedin, NZ, 2003.					
	DARIUSH, B., "A Well-Posed, Embedded Constraint Representation of Joint Moments From Kinesiological Measurements,"						
JH		Journal of Biomechanical Engineering, August 2000, Vol. 122, pp.437-445.	-				
	C20	DELP, S. et al., "A Computational Framework for Simulating and Analyzing Human and Animal Movement," IEEE	1				
JH	1	Computing in Science and Engineering, Vol. 2, No. 5, 2000, pp.46-55.	 				
	C21	DOHRMANN, C.R. et al., "Smoothing Noisy Data Using Dynamic Programming and Generalized Cross-Validation"	├				
		Transactions of the ASME - Journal of Biomechanical Engineering, February 1988, Vol. 110, pp. 37-41.	 				
	C22	FLANAGAN, R.J., et al., 'The Role of Internal Models in Motion Planning and Control: Evidence from Grip Force	<u> </u>				
		Adjustments During Movements of Hand-Held Loads*, The Journal of Neuroscience, February 15, 1997, Vol. 17(4), pp.					
		1519-1528	┼				
	C23	GIAKAS G. et al. "A Comparison of Automatic Filtering Techniques Applied to Biomechanical Walking Data." J. Biomechanic	╫─				
		1997, Vol. 00, No. 00, 4 pages.	+				
	C24	GIAKAS, G. et al., "Optimal Digital Filtering Requires a Different Cut-Off Frequency Strategy for the Determination of the High	-				
		Derivatives," J. Blomechanics, April 1997, Vol. 28, No. 00, 5 pages.	 				
	C25	GROOD, E.S. et al., "A Joint Coordinate System for the Clinical Description of Three Dimensional Motions: Application to	┼				
		the Knee," Journal of Biomechanical Engineering, 1983, pp. 136-144, No. 105.	+				
_	C26	GRUBER, K., et al., "A Comparative Study of Impact Dynamics: Wobbling Mass Model Versus Riold Body Models", Journal	+-				
		of Biomechanics, 31 (1998), pp. 439-444					
	C27	HATZE, H. "The Use of Optimally Regularized Fourier Series for Estimating Higher-Order Derivatives of Noisy	+-				
		Biomechanical Data," J. Biomechanics, 1981, Vol. 14, pp. 13-18.	+-				
	C28	HAYASHIBARA, Y. et al., "Design of a Power Assist System with Consideration of Actuator's Maximum Torque," 4th IEEE					
_	-	International Workshop on Robot and Human Communication, RO-MAN'55, Tokyo, July 5-7, 1995, pp. 676-684, [online]	1				
		Retrieved from the Internet <url:http: abs_free.jsp?arnumber="531990" ieeexplore.ieee.org="" xpl=""></url:http:>					
	C29	HEMAMI, H., "A Feedback On-Off Model of Biped Dynamics", IEEE Transactions on Systems, Man, and Cybernetics, July	+-				
		1980, Vol, SMC-10, No. 7, pp. 376-383					

Examiner Signature 07/06/2006	Date Considered	07/06/2006
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				Art Unit	3736	
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xaminer Initials*	No.1	journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city analog coerasy where	T ⁶
	C30	HEMAMI, H. et al. "Modeling And Control Of Constrained Dynamic Systems With Application To Riged Locomotion In The	—
		Frontal Plane," IEEE Transactions on Automatic Control, Vol. 4, No. 4, August 1979, pp. 526-535.	├
	C31	HEMAMI, H. "A State Space Model for Interconnected Rigid Redies." IEEE Trans. on Automatic Coolint, 1982, pp. 278-382	
	<u> </u>	Vol. 27, no. 2.	
	C32	HOSEIN, Relet al., A Study of the shoe Flantan Shear in Normalis, Crimical Diomechanics, 2000, Vol. 13, pp. 40-33.	
	C33	HUNGSPREUGS, P. et al., "Muscle Force Distribution Estimation Using Static Optimization Techniques", Technical Report	├
		- Honda R&D Americas	╂──
	C4	JALICS, L. et al., "A Control Strategy for Terrain Adaptive Bipedal Locomotion," Autonomous Robots, 1997, pp. 243-257,	+
		Vol. 4.	1
	C35	JEZERNK, S. et al., "Robotic Orthosis Lokomat: A Rehabilitation and Research Tool," Neuromodulation, 2003, pp. 108-115,	+-
		Vol. 6, No. 2.	+-
	C36	KAWATO, M., "Adapation and Learning in Control of Voluntary Movement by the Central Nervous System", 1989, Advanced	┼
		Robotics, Vol. 3, pp. 229-249	1
	C37	KAWATO, M., et at., "The Cerebellum and VOR/OKR Learning Models". Elsevier Science Publishers Ltd., 1992, Vol. 15, No.	十一
		11, pp. 445-453	+
JH	C38	KAWATO, M., "Internal Models for Motor Control and Trajectory Planning," Current Opinion in Neurobiology, 1999, pp. 718-	
	-	727, No. 9.	
·	C39	KHATIB. O. *A Unified Approach For Motion And Force Control Of Robot Manipulators: The Operational Space	T
	-	Formulation, IEEE Journal of Robotics and Automation, RA-3(1), 1987, pp. 43-53.	
	C40	KLEIN C. A. et al. "Review Of Pseudoinverse Control For Use With Kinematically Redundant Manipulators. IEEE	
	-	Transactions on Systems, Man, and Cybernetics, Vol. 13, No. 2, 1983, pp. 245-250.	1
	C41	PARK, J.H. et al., "Biped Robot Walking Using Gravity-Compensated Inverted Pendulum Mode and Computed Torque	+-
		Control, 1998 IEEE Conference on Robotics and Automation, May 15-20, 1998, pp. 2528-2533, Vol. 4, Johnney Retrieved	
		from the Internet <url:http: abs_free.jsp?arnumber="680985" ieeexplore.leee.org="" xpl=""></url:http:>	
, JH	C42	PIAZZA, S. et al., "Three-Dimensional Dynamic Simulation of Total Knee Replacement Motion During a Step-up Task,"	
	-	Journal of Biomechanical Engineering, Vol. 123, 2001, pp.599-606.	
	C43	RAHMAN T. et al. "A Simple Technique to Passively Gravity-Balance Articulated Mechanisms." Journal of Mechanical	
		Design, 1995, pp. 655-658, Vol. 117, No. 4.	$\neg \neg$
_	C44	RUNGE, C.F. et al., "Estimating Net Joint Torques From Kinesiological Data Using Optimal Linear System Theory." IEEE	\top
	C45	Transactions on Biomedical Engineering, December 1995, Vol. 42, No. 12, pp. 1158-1164.	\top
	C45	SHADMEHR, R. et al., *Interference in Learning Internal Models of Inverse Dynamics in Humans,* Advances in Neural	\top
		Information Processing Systems, 1995, pp. 1117-1224, Chapter 7.	

Examiner Signature	/Jeffrey Hoekstra/	Date Considered	07/06/2006
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Examiner Initials*	Cite No. ¹	journal, serial, symposium, catalog, etc.), date, page(s), volume-ussue number(s), publisher, city and occurry when published	T°
•	C48	SHADMEHR, R., *Learning Virtual Equilibrium Trajectories for Control of a Robot Arm*, Neural Computation, 1990, Vol. 2,	
	ļ	pp. 436-446	-
	C47	SIMONS, W. et al., "Differentiation of Human Motion Data Using Combined Spline and Least Squares Concepts," Journal of	
		Biomechanical Engineering, Transactions of the ASME, August 1991, Vol. 113, pp. 348-351.	
JH	C48	THELEN, D. et al., "Generating Dynamic Simulations of Movement Using Computed Muscle Control," Journal of Biomechanics, 36, 2003, pp. 321-328.	
	C49	I fansattal of the International Search Report, PCT/USUZ/Z08Z9, December 1z, 2002, 4 pages.	
	C50		
	1 630	"Unsupported Standing with Minimized Ankla Muscle Fatique." Ignitinal Retrieved from the	
	ļ.,	Internet <url:http: 01315854.pdf="" 10="" 29163="" ieeexplore.ieee.org="" iel5=""></url:http:>	1
	C51	VAUGHAN, C. L. et al., "Appendix B., Detailed Mathematics Used in GaitLab," Dynamics of Human Gait, Second Edition,	1
JH	<u> </u>	Kiboho Publishers, Cape Town South Africa, 1999, pp. 83-106.	
	C52	VOKOBNATOVIC, M. et al., Scientific Fondamentals of Robotics 7. Biped Loco-motion. Springer-Verlag, 1990, pp. 17-27.	I
	C53	WINTER D.A. "Kinetics: Forces and Moments of Force." Biomechanics and Motor Control of Human Movement. 2nd Ed.	┿
		New York, 1990, Chapter 4.	
	C64	WITTERBERG, J., Dynamics of Systems of Rigid Bodies, 1977, B.G. Teubher Stutigan, 1977, pp. 29-30.	-
	C55	WOI PERT D.M. et al. "Ocular Limit Cycles Induced by Delayed Retinal Feedback" Experimental Brain Research, 1993, Vo	4-
		96, pp. 173-180	+-
	C56	WOLTRING, H.J. "A Fortran Package for Generalized, Cross Validatory Spline Smoothing and Differentiation," Adv. Eng.	-
		Software, 1986, Vol. 8, No. 2, pp. 104-107.	
	C57	WOLTRING, H.J., "On Optimal Smoothing and Derivative Estimation From Noisy Displacement Data in Biomechanics,"	┿
		Human Movement Science, Vol. 4, 1985, pp. 229-245.	+
	C58	Wildelf Opinion, PC (NBO204511, Pabridally 20, 2005, 2 pages)	+
	C59	7A.IAC. F.E. "Muscle and Tendon Properties. Models. Scaling, and Application to Biomechancis and Motor Control", 1989,	┿
		Vol. 17, Issue 4, pp. 359-411	

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